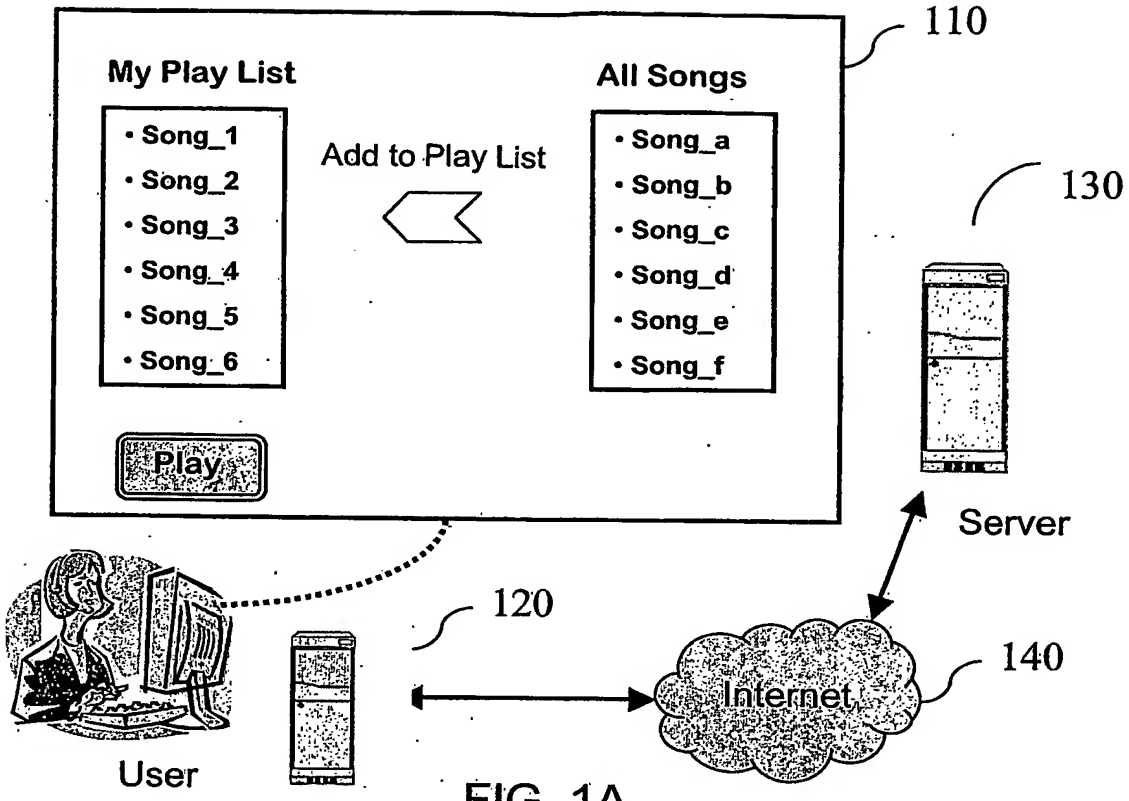

110
My Play List
• Song_1
• Song_2
• Song_3
• Song_4
• Song_5
• Song_6
Add to Play List
All Songs
• Song_a
• Song_b
• Song_c
• Song_d
• Song_e
• Song_f
Play
130
Server
120
140
Internet
User

FIG. 1A

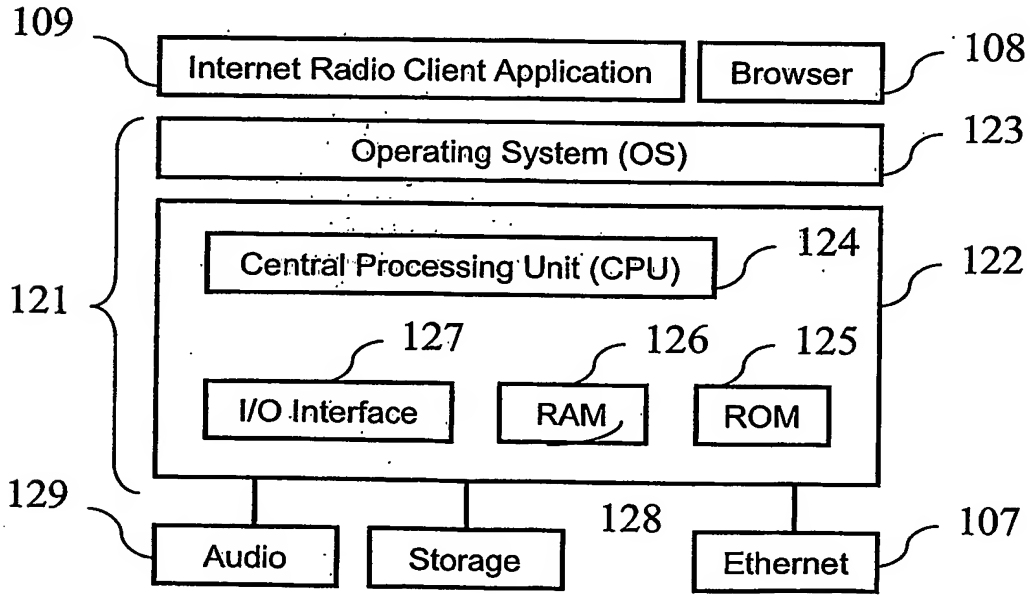

109
Internet Radio Client Application
Browser
108
Operating System (OS)
123
121
Central Processing Unit (CPU)
124
122
127
126
125
I/O Interface
RAM
ROM
129
128
107
Audio
Storage
Ethernet

FIG. 1B

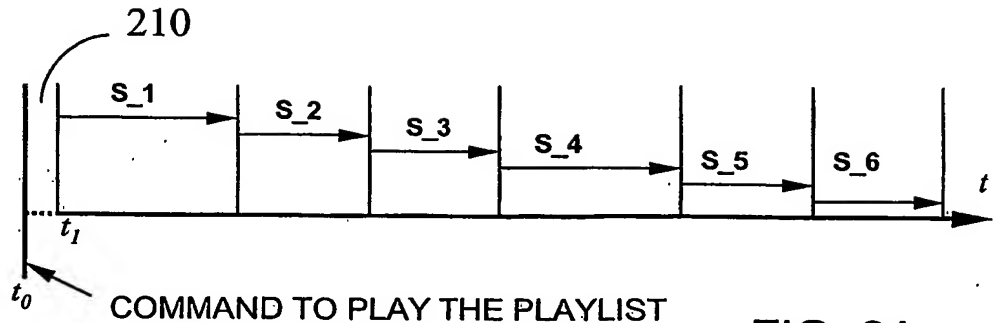


FIG. 2A

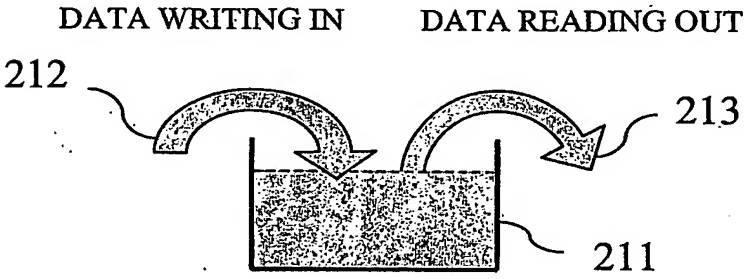
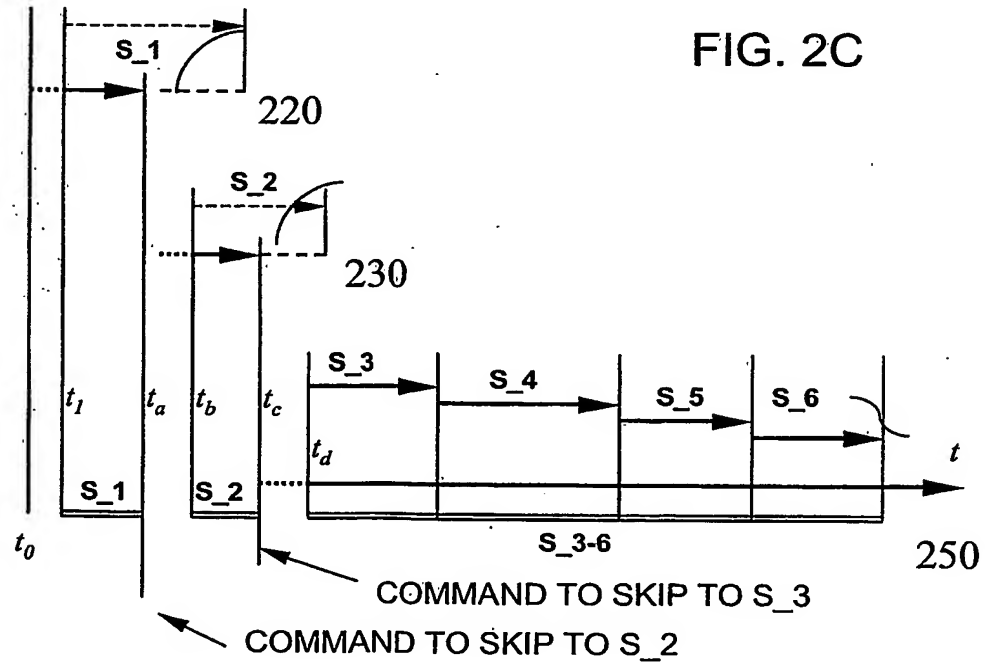


FIG. 2B

FIG. 2C



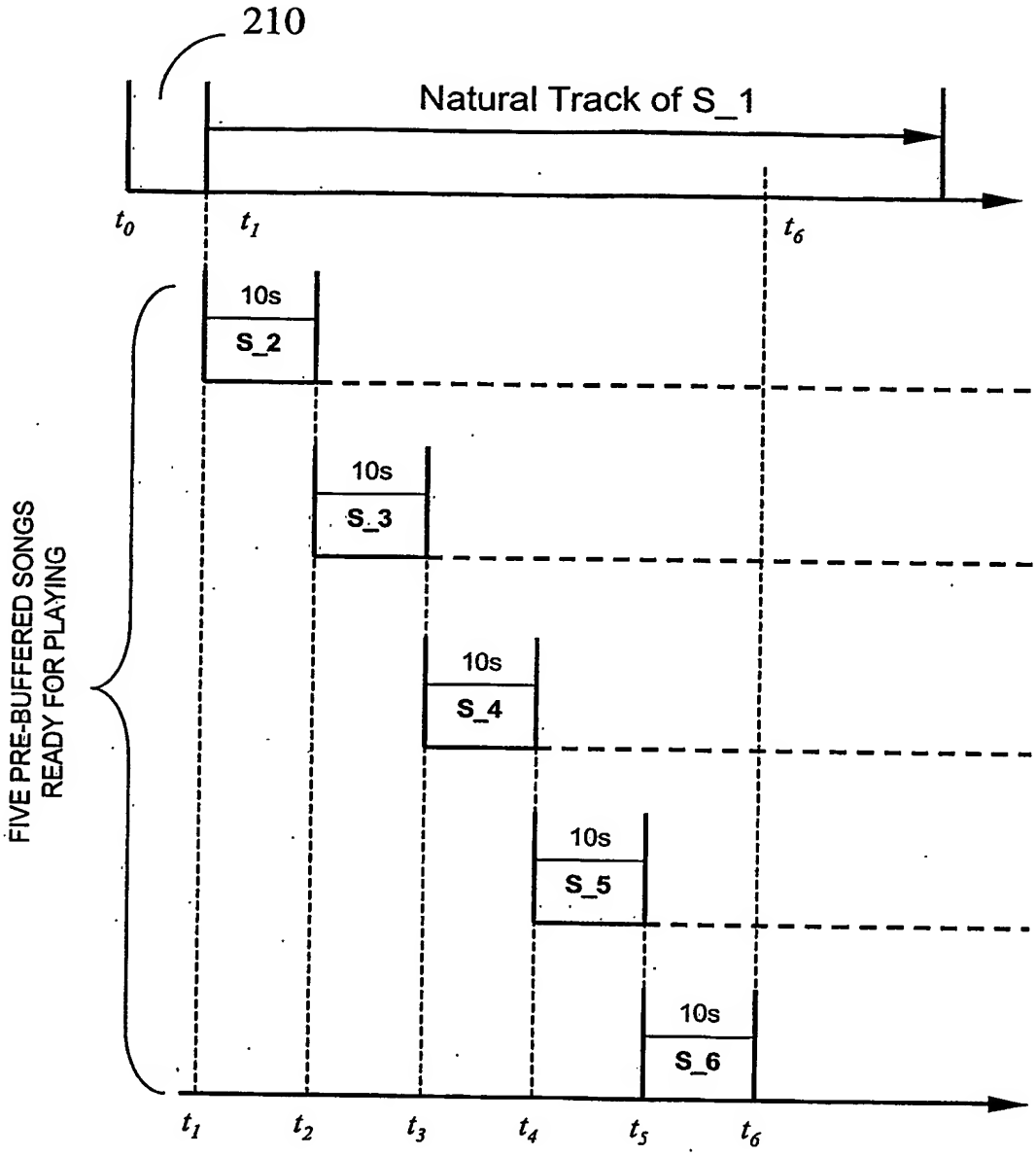

210
Natural Track of S_1
t_0
t_1
t_6
10s
S_2
10s
S_3
10s
S_4
10s
S_5
10s
S_6
FIVE PRE-BUFFERED SONGS READY FOR PLAYING
t_1
t_2
t_3
t_4
t_5
t_6

FIG. 3A

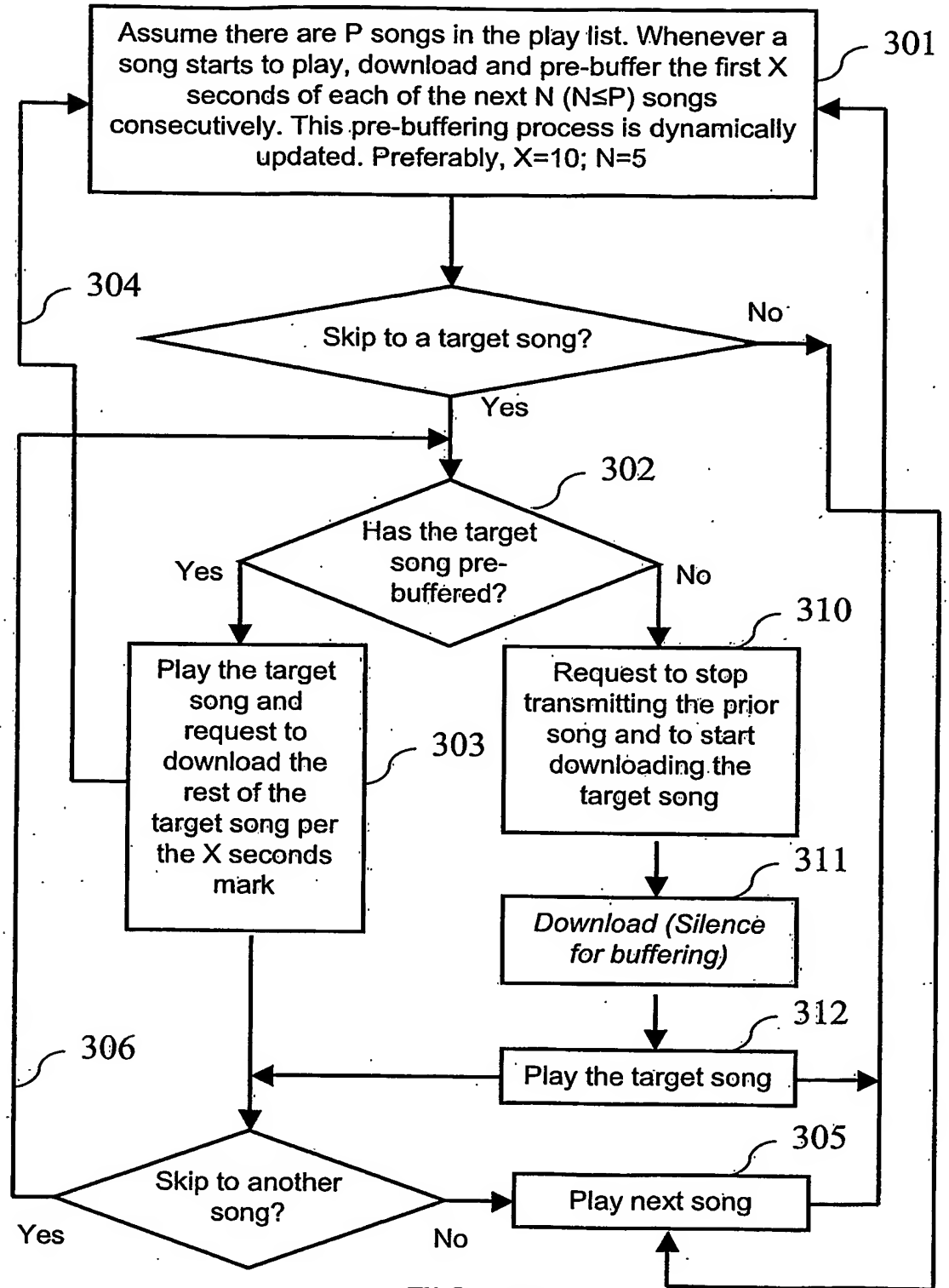

Assume there are P songs in the play list. Whenever a song starts to play, download and pre-buffer the first X seconds of each of the next N (N≤P) songs consecutively. This pre-buffering process is dynamically updated. Preferably, X=10; N=5
301
304
Skip to a target song?
No
Yes
302
Has the target song pre-buffered?
Yes
No
310
Play the target song and request to download the rest of the target song per the X seconds mark
303
Request to stop transmitting the prior song and to start downloading the target song
311
Download (Silence for buffering)
312
306
Play the target song
305
Skip to another song?
Play next song
Yes
No

FIG. 3B

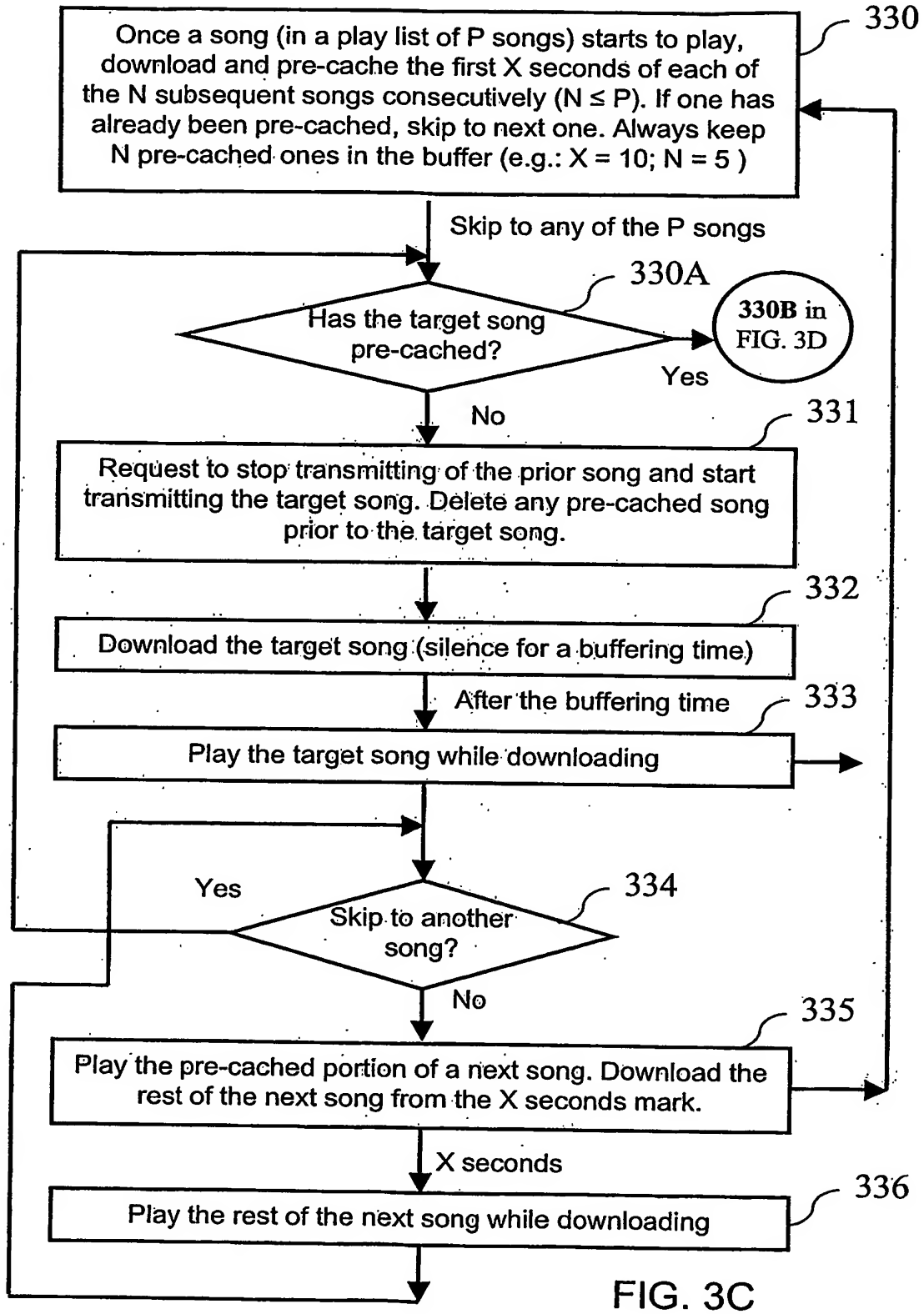

Once a song (in a play list of P songs) starts to play, download and pre-cache the first X seconds of each of the N subsequent songs consecutively (N ≤ P). If one has already been pre-cached, skip to next one. Always keep N pre-cached ones in the buffer (e.g.: X = 10; N = 5)
330
Skip to any of the P songs
330A
Has the target song pre-cached?
330B in FIG. 3D
Yes
No
331
Request to stop transmitting of the prior song and start transmitting the target song. Delete any pre-cached song prior to the target song.
332
Download the target song (silence for a buffering time)
After the buffering time
333
Play the target song while downloading
Yes
334
Skip to another song?
No
335
Play the pre-cached portion of a next song. Download the rest of the next song from the X seconds mark.
X seconds
336
Play the rest of the next song while downloading

FIG. 3C

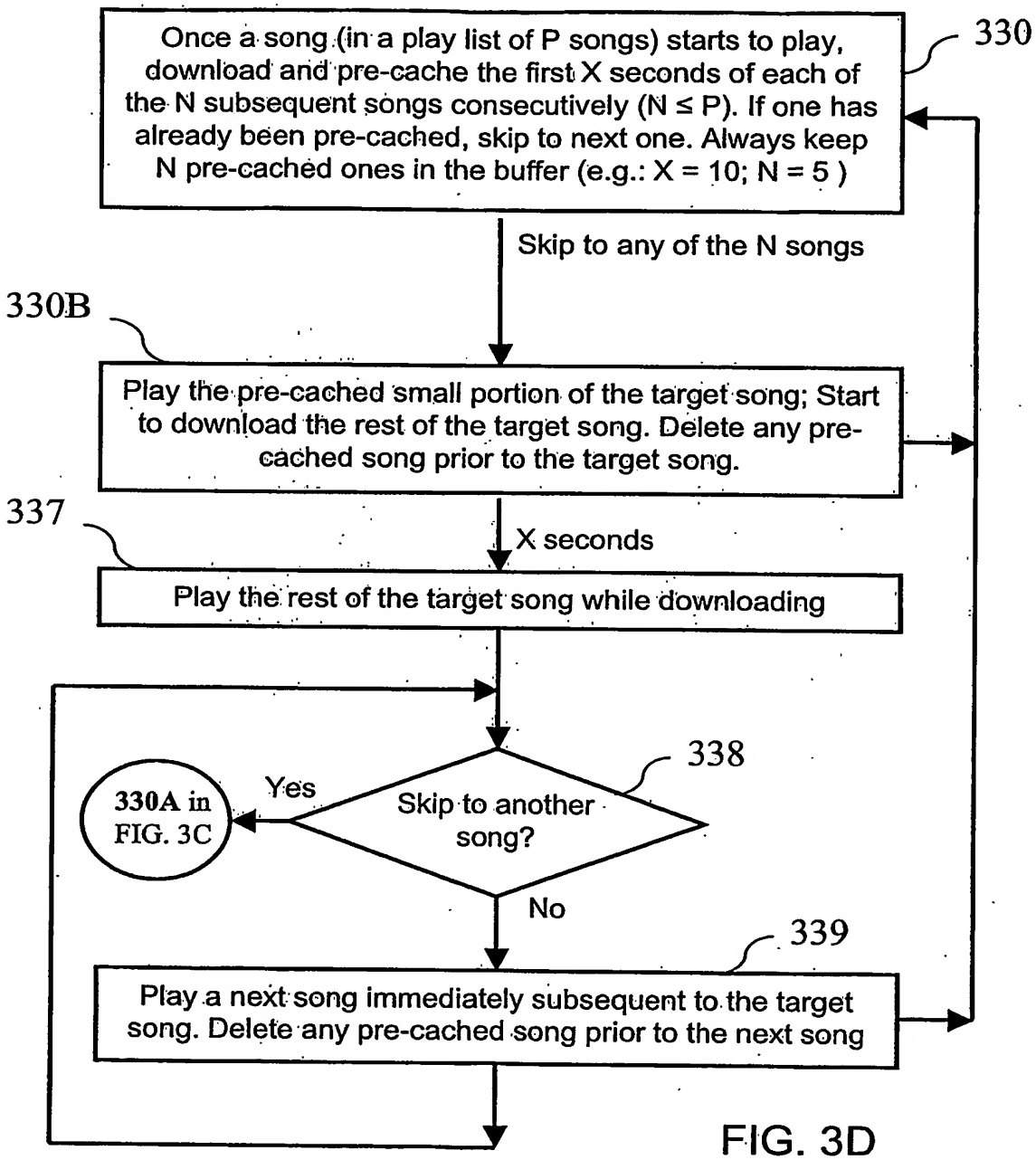

Once a song (in a play list of P songs) starts to play, download and pre-cache the first X seconds of each of the N subsequent songs consecutively (N ≤ P). If one has already been pre-cached, skip to next one. Always keep N pre-cached ones in the buffer (e.g.: X = 10; N = 5)
330
Skip to any of the N songs
330B
Play the pre-cached small portion of the target song; Start to download the rest of the target song. Delete any pre-cached song prior to the target song.
337
X seconds
Play the rest of the target song while downloading
338
Skip to another song?
Yes
330A in FIG. 3C
No
339
Play a next song immediately subsequent to the target song. Delete any pre-cached song prior to the next song

FIG. 3D

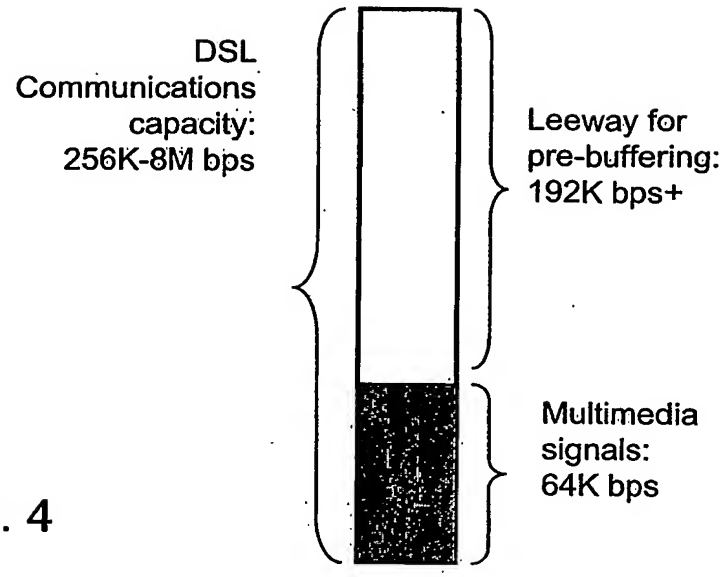

DSL
Communications
capacity:
256K-8M bps
Leeway for
pre-buffering:
192K bps+
Multimedia
signals:
64K bps

FIG. 4